Systematic Literature Review and Meta-analysis: A comparative study

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Nimananda Rijal[1]

ORCID No: 0000-0002-8046-3325

[1]Public Health Research Society Nepal

Abstract: Thirty thousand research journals now exist, and projections indicate that there will be 33,080-34,050 by 2025. The number of research articles is continually increasing, with millions now in existence. Selecting appropriate papers for a review might be difficult for a researcher. Finding the appropriate research and ideas to address this problem was made possible via a systematic review. Its main use is in the medical sphere, but it is also helpful in other academic domains. The PRISMA framework, which is provided by systematic reviews, makes it obvious how to incorporate articles that are relevant to the goals and research questions. The meta-analysis is a component of the systematic review that addresses statistical analysis and has a definite question of analysis. Similarities exists between systematic literature in terms of determining appropriate academic articles, objectives, and questions. In terms of analysis, SR considers qualitative analysis, which should be conducted through a qualitative analysis process, while meta-analysis solely examines statistical data and produces reports in line with that analysis. Researchers must choose the appropriate research articles using a systematic review and they should be patience while conducting systematic review and recommended to conduct it in a group.

Keywords: Meta-analysis, Objectives, PRISMA, Systematic review.

Declaration: There is no conflict of interest.

Introduction

There are millions of articles published worldwide, making it challenging to examine the appropriate articles. Additionally, the amount of information available is growing, so it is necessary to choose the appropriate articles based on the goals. 'Since 1996, 674 million scholarly papers have been published. Currently, there are over 30,000 academic publications worldwide, and by 2025, that number is expected to rise to 33,080-34,050 journals. Science, engineering, humanities, social sciences, medicine, law, management, information technology, mathematics, business, accounting, education, and psychology are just a few of the subjects and scopes covered by the magazines (M, 2023) How can a literature review help with a research article? In most cases, novices will pose the query on their own.

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'Although a literature review is often thought of as a simple description of the source, it is much more than this. As such, it should be viewed as a synthesis that reorganizes or reshuffles the material without changing the core notion of the source. It also traces the development of the field's ideas, covering significant debates in the field of study. Along with evaluating the source, it gives the readers the most relevant data accessible for their area of study' (Libguides, 2023).

The systematic literature review should fit according to the objectives and purpose of the research. "The expansion of evidence-based practice across sectors has led to an increasing variety of review types. However, the diversity of terminology used means that the full potential of these review types may be lost amongst a confusion of indistinct and misapplied terms' ' (Maria J. Grant & Andrew Booth, 2009). They have highlighted 14 different types of literature reviews, all of which have different perspectives, Literature reviews are mentioned as generic terms as well. These types are mentioned as 'Critical review, mapping review/ systematic map, meta-analysis, mixed methods review (mixed methods review), overview, qualitative systematic review/qualitative evidence synthesis, rapid review, scoping review, state-of-the-art review, systematic review, systematic search and review, systematic review, and overview review' (Maria J. Grant & Andrew Booth, 2009). There are some common types of literature reviews are 'Narrative or traditional literature reviews, Critically Appraised Topics (CAT), scoping reviews, systematic literature reviews, and annotated bibliographies' (Libguides, Literature Review: Types of Literature Reviews). There are different approaches to reviewing the literature, some of which are the most common, CAT and annotated bibliography are not included in the 14 types of literature review; What does this mean? Certainly, the reviewer must select the appropriate literature review according to their purpose. All reviews have some advantages and disadvantages, but the literature review provides a way to identify the gaps in the research and identify the research areas.

Objective of the study: The study focused on the use of systematic literature review and meta-analysis so that the researcher would be able to use these two different methods to review and use in their research.

Methodology: Qualitative research is used based on the published literature on the issue of systematic literature review and meta-analysis.

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Systematic review

"A systematic approach to literature review attempts to identify the best available evidence to answer specific questions" (Sharp, 2004). Basically the systematic review is the collection of the articles written in the same topics to satisfy the set objectives of the researchers. 'It has three different aspects identify, select, critically analyze primary research to extract the data, views included in the research and provides evidence based research (Wright, Rick W. ; Brand, Richard A.; Dunn, Warren ; & Spindler, Kurt., 2007). "Literature reviews can and are conducted with varying standards of rigor, ranging from little more than an annotated bibliography to scientifically rigorous syntheses of a body of primary research. It is the more rigorous approach to conducting a stand-alone literature review that we refer to as a systematic literature review (SLR)" (Chitu Okoli & Kira Schabram, 2010). "While the systematic review has several advantages, it has several limitations which can affect the conclusion. Inadequate literature searches and heterogeneous studies can lead to false conclusions. Similarly, the quality of assessment is an important step in systematic reviews, and it can lead to adverse consequences if not done properly" (Nusrat Jahan, Sadiq Naveed, Muhammad Zeshan & Muhammad A. Tahir, 2016).

Characteristics of systematic review

- **Article selection:** There is a pool of articles in the different research sectors.
- **Provision of inclusion or exclusion:** This should be made by the objectives of the review.
- **Working in a group**: It provides to removal of biases and the selection of proper articles to include and exclude.
- **This paves the way for meta-analysis**: The meta-analysis should follow the process of selecting articles to analyze.
- **Narrative review:** It paves the way for narrative review as well.
- **Locally published books and reports**: It also provides an opportunity to include local-level published books, articles, and reports in the systematic review.
- **Knowledge management:** It helps to develop comprehensive knowledge in the published articles, which helps in knowledge management as well**.**
- **Jada Randomized Control Trial (RCT):** It helps to select the articles; it is highly required in medical research as well.

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Process of systematic review: The systematic review should be conducted from the preparation period to report writing. **"PRISMA** stands for Preferred Reporting Items for Systematic Reviews and Meta-Analyses. It is an evidence-based minimum set of items for reporting in systematic reviews and meta-analyses and the recognized standard for reporting evidence in systematic reviews and meta-analyses. The standards are endorsed by organizations and journals" (Libguide, 2024). A checklist should be prepared before filling out the flow diagram of PRISMA, the checklist should be prepared well in advance, and the flow diagram needs to be established at the end of the study. Research synthesis should be carried out. There are 8 stages. Before starting the flow diagram, the researcher needs to think about stages, such as 'i). Formulating research question: PICO (C); it stands for population, intervention, compare (context), outcome; ii). Define inclusion and exclusion criteria: The authors must decide the criteria to include or exclude in the study and what types of studies to include and exclude.; iii). Develop a search strategy and locate studies: Generally, it is important to produce a comprehensive list of key terms (i.e., ("MeSH " terms) related to each component of PICOC to be able to identify all relevant studies in an area; iv). After retrieving and reviewing a comprehensive list of abstracts, any studies that appear to meet inclusion criteria would then be obtained and reviewed in full; v). To organize the information extracted from each reviewed study, a simple data extraction form or table can be helpful; vii). Assess study quality: commonly used in Cochrane reviews, this measure is heavily influenced by double-blinding which is appropriate for drug trials but generally not for psychological or non-pharmacological interventions; vii). Analyze and interpret results: Data analysis tools are available, these could be used to analyze the research, such as review manager (REvM); viii). Disseminate findings: This should be presented in plain language so that the stakeholders would be able to understand the outcome of the research' (Lindsay S. Uman, 2001

'The flow chart for the Systematic review is given below; 'it is also known as PRISMA which stands for Preferred Reporting Items for Systematic reviews and Meta-Analyses' (Library, nd). "Readers can easily comprehend the steps of evidence syntheses using flowcharts, and they can track the removal of unnecessary records as the review proceeds. The PRISMA flow diagram published in 2009 describes the sources, numbers, and fates of all identified and screened records in a review. PRISMA 2020 updated version is in the flow diagram below" (Eshackathon, 2020).

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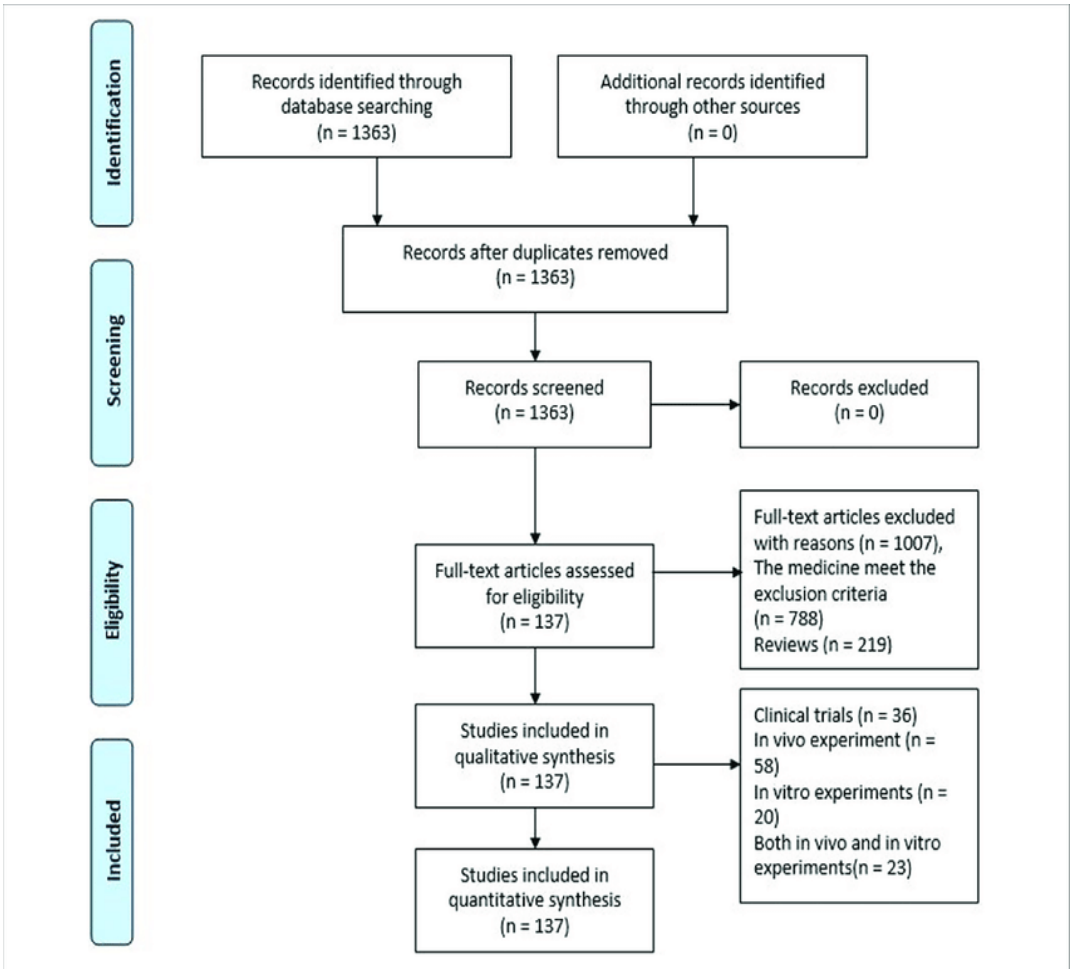
PRISMA 2020 updated version



Source: (Eshackathon, 2020).

This flow diagram should be followed to identify the reviewing journal. To conduct a systematic review, at least there should be a team of 2 people. It takes more effort to conclude the selected articles, the articles should have been studied thoroughly and identify the required information as per the set object of the research.

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Meta-Analysis

Meta-analysis could be said to be a subset of systematic review, but it has different objectives**.** *"Meta-analysis* is a statistical process that combines the data of multiple studies to find common results and to identify overall trends" (Dictionary.com, 2024). To describe "the statistical analysis of a large collection of analysis results from individual studies to integrate the findings," Gene Glass, one of them, first used the phrase "meta-analysis" in 1976. Soon after, 15 articles and textbooks on meta-analysis were published' (O'Rourke, 2007) "Meta-analysis refers to the statistical analysis of the data from independent primary studies focused on the same question, which aims to generate a quantitative estimate of the studied phenomenon, for example, the effectiveness of the intervention" (S. Gopalakrishnan, P. Ganeshkumar., 2013). 'Meta-analysis combines the relevant qualitative and quantitative study data from several selected studies to draw a single conclusion that provides greater statistical power than the analysis of any single study' (GWU, 2023).

The process of Meta-analysis is applied in all areas of research, but it has been frequently applied in the medical sector. "Given the explosion of medical literature, and the fact that time is always scarce, review articles play a vital role in decision making in evidence-based medical practice" (S. Gopalakrishnan, P. Ganeshkumar., 2013). There are many meta-analysis tools some of them are free to download those are found as "revman 5,metafor (r package) jasp, jamovi,meta-essentials (excel workbook),metaxl (excel add-on),met easy, openmee, opened[analyst], metastat, meta-analysis, metagenyo. All these are freely available" (Bradburn, 2024).

Similarities of systematic review and meta-analysis.

- Both analyses need to prepare the checklist before the search of the articles. They must follow the process of including and excluding the articles or data.
- Both need to be developed as part of the systematic review, as indicated in the PRISMA analysis process.
- Meta-analysis also needs clear questions, as does the systematic review

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Comparison in between systematic review and Meta-analysis

S.N	Systematic Review	Meta-Analysis
1	It is the study of the pertinent scholarly articles.	It analyzes relevant data study from qualitative and quantitative study.
2	"A systematic literature review is a detailed overview of primary research on a focused, specific question that identifies, selects, synthesizes, and appraises all high-quality research evidence relevant to that question" (study skills, 2021).	A meta-analysis is a type of systematic review that summarizes and compares data using statistical techniques" (study skills, 2021)
3	It paves the way forward for meta-analysis.	It has greater statistical power and depends on statistical data.
4	It needs to filter the relevant articles and find the similarities of the articles.	It analyzes the data of the filtered articles.
5	The process takes a lot of time and effort to find the relevant articles, it does not combine the data as one and analyze for a single conclusion.	"A Meta-Analysis pools together the sample populations from different studies, such as Randomized Controlled Trials, into one statistical analysis and treats them as one large sample population with one conclusion" (GWU, 2023).
6	It also needs some statistical techniques but not advanced ones.	Requires advanced statistical techniques.
7	It is more concerned with the individual analysis and their findings.	Heterogeneity of the population has difficulties in decision making.
8	It needs to study more relevant studies	It could be done by pulling the relevant study data from two or more data and analyzing.
9	It is in the second last stage in the pyramid of the review process.	It is an apex of analysis in the pyramid of review

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Differences in reporting structure

10	Systematic review	Meta-analysis
	Key questions to be addressed. Context; Objectives; Methodology; Results; Conclusions; Reference list.	"Variable, but generally follow the structure of a scientific report: Introduction; Method Results; Discussion; Conclusion; Reference list; Appendices" (Andy P. Siddaway; Alex M. Wood; and Larry V. Hedges, 2019).

Conclusion: Systematic review and meta-analysis found two sides of the same coin, these are related to one another, and said meta-analysis is a subset of systematic review. Both analyses have some advantages and constraints. This analysis provides an in-depth understanding of the selected topics of the study and meta-analysis frequently used in the medical field. It helps to be updated in the sector and in decision-making as well. It is based on statistical analysis, and findings are also drawn accordingly.

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